

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY


(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 17 NOV 2005

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Applicant's or agent's file reference PD030038	FOR FURTHER ACTION		See Form PCT/PEA416
International application No. PCT/EP2004/002996	International filing date (day/month/year) 22.03.2004	Priority date (day/month/year) 02.04.2003	
International Patent Classification (IPC) or national classification and IPC G11B20/00, G11B27/00, H04N7/50, G11B27/034, G11B27/10, G11B27/30, G11B27/036			
Applicant THOMSON Licensing S.A.			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 26.01.2005		Date of completion of this report 16.11.2005	
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International application No.
PCT/EP2004/002996

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-19 as originally filed

Claims, Numbers

1-10 received on 26.01.2005 with letter of 17.01.2005

Drawings, Sheets

1/3-3/3 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-10
	No: Claims	
Inventive step (IS)	Yes: Claims	1-10
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-10
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following documents:

D1: EP-A-1 328 118 (MATSUSHITA ELECTRIC IND CO LTD) 16 July 2003 (2003-07-16)

&

D1* : WO 02 23896 A (SHIMOTASHIRO MASAFUMI; ITOH MASANORI (JP);
MATSUSHITA ELECTRIC IND) 21 March 2002 (2002-03-21)

*: **D1'** is from the same family as **D1**, ie. its priority is also a priority of **D1**. A copy of this document is annexed to this communication.

D1 has been published on 16.07.2003 that is between the date of filing (22.03.2004) and the date of priority (02.04.2003) of the present application and has a priority date (18.09.2000) earlier than the date of priority of the present application is a published document within the meaning of Rule 64.3 PCT.

D1' is part of the prior art within the meaning of Rule 64.1 PCT.

It is assumed that the teachings of **D1** reflect the teachings of **D1'** as **D1** is based on the same priority document as one priority of **D1'**. Furthermore the figures 1, 5 to 10, 17 to 19, 21 to 24, of **D1'** are also present in **D1**.

1.1. Document **D1**, which is considered to represent the most relevant state of the art, discloses A method for controlling a pick-up for reading data streams from a storage medium (figures 1, 7-10, 22-24), the data streams being used for simultaneous reproduction and belonging to different data types with different constant or variable data rates (column 2, line 28, to column 3, line 1; column 3, lines 21-45; figures 5, 6, 17-19), and the data streams being distributed to more than one file on said storage medium (figure 19) and being separately buffered after reading (figure 9), with the amount of buffered data relating to any of said data streams being at least such that subsequent processing can be provided with the buffered data during the time required for accessing and reading the other data streams of the other data types (column 3, line 46, to column 4, line 29; figure 21), the method comprising :

- buffering a first data stream of a first data type, the data stream having the highest buffer

output data rate of all said buffered data streams (column 15, line 56, to column 16, line 14; figure 9: "Motion picture buffer memory" (164), V_r ; column 16, lines 15-20; column 18, line 54, to column 21, line 35; figure 10);

indeed in **D1**, $V_{out} = 10$ Mbps and $A_{out} = 288$ kbps (column 20, lines 43-48);

- accessing the data streams by the pick-up according to a predefined temporal scheme (column 16, lines 15-20; column 18, line 54, to column 21, line 35; figure 10), the scheme being such that, after an initialization, for any three successively read data streams, wherein the second is another than said first data stream, the first and last data stream is said first data stream (figure 10).

- the pick-up is an optical pick-up (column 1, lines 5-9, "pick-up" (130)),

- the pick-up data rate (V_p) is higher than any of the buffer output data rates (data reproducing rates V_o) (paragraphs [0015]-[0017]);

from which the subject-matter of claim 1 differs in that:

a) said first data stream is read and buffered periodically in periods of a first period time (T);

b) for any three successive data stream accesses, wherein the second access reads another than said first data stream, the first and last accesses read said first data stream, and wherein the data streams other than said first data stream are accessed and buffered in a constant predetermined order in periods of integer multiples of said first period time ($n \cdot T$, $k \cdot n \cdot T$).

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as providing a scheduling method that enables data to be reproduced seamlessly by reducing the pick-up jump frequency and by using a minimum of buffering space to the buffering of Out-Of-Multiplex (OOM) formatted data (see description, on page 1, line 17, to page 3, line 21)

The solution to this problem proposed in claim 1 of the present application is considered

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(SEPARATE SHEET)**

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as involving an inventive step (Article 33(3) PCT) for the following reasons:
this particular scheduling scheme is not rendered obvious by the prior art at hand.

Claims 2 to 9 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

The above applies mutatis mutandis to independent apparatus claim 10, which comprises all the technical features of method claim 1 but in terms of device means.

New Claims

1. A method for controlling a pick-up for reading three or more data streams from a storage medium, the data streams being used for simultaneous reproduction and belonging to different data types with different constant or variable data rates, and the data streams being distributed to more than one file on said storage medium and being separately buffered after reading, wherein the pick-up data rate (R_D) is higher than any of the buffer output data rates (R_V, R_A, R_S), with the amount of buffered data relating to any of said data streams being at least such that subsequent processing can be provided with the buffered data during the time required for accessing and reading the other data streams of the other data types, the method comprising:

- buffering (B_{video}) a first data stream of a first data type, the data stream having the highest buffer output data rate of all said three or more buffered data streams, wherein said first data stream is read and buffered periodically in periods of a first period time (T); and
- accessing the data streams by the pick-up according to a predefined temporal scheme, the scheme being such that, after an initialization, for any three successive data stream accesses, wherein the second access reads another than said first data stream, the first and last accesses read said first data stream, and wherein the data streams other than said first data stream are accessed and buffered in a constant predetermined order in periods of integer multiples of said first period time ($n \cdot T$,

$k \cdot n \cdot T$).

2. Method according to claim 1, wherein the pick-up is an optical pick-up and the data streams comprise a video data stream, an audio data stream and a subtitle data stream.
3. Method according to claim 1 or 2, wherein said periods for reading the other buffers are individual for each buffer, such that the period for reading of a data stream from the storage medium is the shorter, the higher the buffer output data rate of the data stream is.
4. Method according to any of the previous claims, wherein the periods ($n \cdot T$, $k \cdot n \cdot T$) relating to accessing and buffering the other data streams than said first data stream are integer (k) multiples of each other.
5. Method according to any of the previous claims, wherein n is at least two and k is one or more.
6. Method according to any of the previous claims, wherein an interrupt request may interrupt the scheme, and after serving the interrupt request the same scheme as before is continued, wherein said continuing of the same scheme is achieved by loading one or more buffers only partially, to the level the buffer or buffers would have in the scheme at that time ($T_{d,a}$, $T_{d,v}$) if the scheme had been continued without interruption.

7. Method according to any of the previous claims,
wherein the start-up procedure comprises buffering an
individual initial amount of data from each data
stream, wherein the initial amount of buffered data
is sufficient for each of the respective decoders to
start working, and wherein the initial amount of
buffered data corresponds to a position (S^*) within
the scheme where the amount of buffered data of the
lower rated streams is minimal.
8. Method according to any of the previous claims,
wherein additional data from other streams than said
first data stream are buffered (B_{audio} , B_{sub}), the
additionally buffered data leading to an additional
time (t_d) during which these additional data are
output from the buffer, the additional buffer output
time (t_d) being shorter than said period (T).
9. Method according to any of the previous claims,
wherein additional data from said first data stream
is buffered (B_{video}), the additionally buffered data
leading to an additional time ($T_j + T_{\text{GOP}}$) during which
these additional data are output from the buffer, the
additional time ($T_j + T_{\text{GOP}}$) being shorter than said
period (T), wherein T_j corresponds to the period when
the scheduler interrupts the pick-up reading of a
current video stream and moves to another stream that
contains the video data for a requested angle, and
 T_{GOP} corresponds to a duration of a data unit that is
sufficient for decoding.
10. Apparatus for reading three or more data streams for
simultaneous reproduction from a storage medium, the

data streams belonging to different data types with different constant or variable data rates, and the data streams being distributed to more than one file on said storage medium and being separately buffered after reading, wherein the pick-up data rate (R_D) is higher than any of the buffer output data rates (R_V, R_A, R_S), with the amount of buffered data relating to any of said data streams being at least such that subsequent processing can be provided with the buffered data during the time required for accessing and reading the other data streams of the other data types, the apparatus comprising:

- means for buffering (B_{video}) a first data stream of a first data type, the data stream having the highest buffer output data rate of all said buffered data streams, wherein said first data stream is read and buffered periodically in periods of a first period time (T); and
- means for controlling a pick-up for reading the data streams, wherein the pick-up accesses the data streams according to a predefined temporal scheme, the scheme being such that, after an initialization, for any three successively read data streams, wherein the second access reads another than said first data stream, the first and last accesses read said first data stream, and wherein the data streams other than said first data stream are accessed and buffered in a constant predetermined order in periods of integer multiples of said first period time ($n \cdot T, k \cdot n \cdot T$).



AMENDED SHEET

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